



356323

## **Declaration for Record of Decision**

**Statutory Preference for Treatment as a  
Principal Element is met  
and Five Year Site Review is Required**

### **Site Name and Location**

New Jersey Zinc / Mobil Chemical National Priorities List Site  
DePue, Illinois  
ILD062340641

### **Statement of Basis and Purpose**

This decision document presents the selected remedial action for the New Jersey Zinc / Mobil Chemical National Priorities List (NPL) site, in DePue, Illinois, which was chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable the National Contingency Plan. This decision is based on the administrative record file for this site.

The United States Environmental Protection Agency concurs with the selected remedy.

### **Assessment of the Site**

The response action selected in this Interim Action Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

### **Description of the Selected Remedy**

This operable unit is an interim action for the site. Adjacent operable unit RODs will address any residual sediment contamination, groundwater contamination and discharges of contaminated groundwater discharge to surface water. This interim action addresses the principal threat at the South Ditch Operable Unit by removal of metals contaminated unnatural sediment with containment of that sediment on-site pending selection of final remedies for higher quantity operable units with similar but less mobile contaminants. The actions detailed in this Interim Action ROD will prevent further migration of contaminants to receiving surface water bodies, stabilize the unnatural sediment in a Corrective Action Management Unit reducing the exposure potential to human and sensitive ecological receptors, and maintain the high concentration metals containing sediment in a discrete unit. A final remedy will be selected for the unnatural sediment which is consistent with / complementary to remedies for other operable units at the site containing much larger quantities of similar material; resource recovery (redirection of the waste to metals reclamation technologies) will be considered during selection of remedies for those other Operable Units and the unnatural sediment has the potential to be included in that resource recovery. As on-site containment is a key component of the remedy long-term management and monitoring of the site will be required.

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MAR 29 2004

**REVIEWER MD**

**Declaration for the South Ditch Interim Record of Decision  
New Jersey Zinc/Mobil Chemical NPL Site  
Page 2 of 3**

**The key components of the Selected Remedy are as follows:**

- **Treatability Studies to determine appropriate admixtures and dosage rates to achieve adequate contaminant removal from discharge water streams; retention (settling) time required in decant basins., assessment of physical treatment enhancements likely to assist in to meeting discharge criteria (i.e. high volume sand filtration); pilot evaluations of mechanical techniques for high solids sediment removal; physical stabilization and chemical fixation agents, mixing rates and curing times required prior to placement of sediment in the Interim Containment Cell; and silt fence material selection, placement and maintenance frequency;**
- **Construction of settling basins (decant ponds);**
- **Construction of an interim containment cell where the bottom and sidewalls of the cell will generally consist of a graded layer of low-permeability soil, a synthetic impermeable liner and an aggregate drainage layer under the stabilized unnatural sediments;**
- **Hydraulic and / or mechanical dredging of unnatural sediments;**
- **Dewatering, stabilization and finally placement of the stabilized unnatural sediment into the interim containment cell;**
- **Construction of a solid waste cap over the interim containment cell;**
- **Monitoring and maintenance for the interim containment.**

**Statutory Determinations**

**Statutory Requirements -** The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technology to the maximum extent practicable.

**Statutory Preference for Treatment –** The interim remedy for this OU satisfies the statutory preference for treatment as a principle element of the remedy.

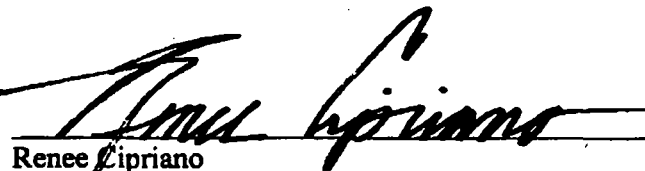
**Five-Year Review Requirements -** Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

**Interim Action ROD Data Certification Check List**

The following information is included in the Decision Summary section of this Interim Action Record of Decision. Additional information can be found in the Administrative Record file for this site.

**Declaration for the South Ditch Interim Record of Decision  
New Jersey Zinc/Mobil Chemical NPL Site  
Page 3 of 3**

- Chemicals of concern and their respective concentrations (Table 1)
- Screening level risk represented by the chemicals of concern (Baseline Risk Assessment deferred to final RI of surrounding OUs). (Table 2)
- Cleanup levels established for chemicals of concern and the basis for these levels. (Section VIII)
- How source materials constituting principle threats are addressed. (Section XII)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the Screening Level risk assessment and ROD. (Section VI)
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy. (Section VII)
- Estimated capital, annual operation and maintenance (O&M), and total present worth cost, discount rate, and the number of years over which the remedy cost estimates are projected. (Section IX)
- Key factor(s) that led to selecting the interim remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision). (Section X)



Renee Cipriano  
Director

Illinois Environmental Protection Agency

OCT 03 2003



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**REGION 5**  
**77 WEST JACKSON BOULEVARD**  
**CHICAGO, IL 60604-3590**

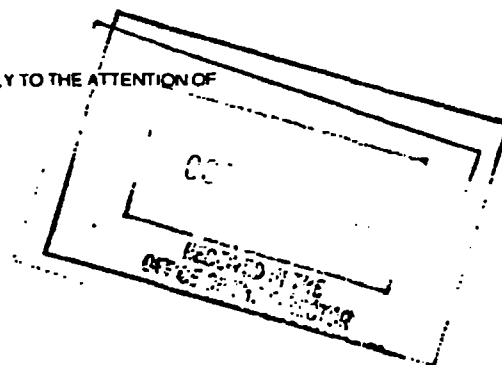
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**OCT 08 2003**

Renee Cipriano, Director  
Illinois Environmental Protection Agency  
1021 N. Grand Avenue East  
Springfield, Illinois 62702

REPLY TO THE ATTENTION OF



**Re: Record of Decision for New Jersey Zinc/Mobil Chemical Site in DePue, Illinois**

Dear Ms. Cipriano:

The U.S. Environmental Protection Agency (USEPA) has reviewed the Record of Decision (ROD) and the Responsiveness Summary prepared for the South Ditch Interim Action at the above-referenced Site that was prepared by the Illinois Environmental Protection Agency (IEPA). The USEPA also reviewed the Proposed Plan and attended the Public Meeting about this Proposed Plan on October 9, 2002.

The USEPA concurs with the IEPA in selection of Alternative #4B - Removal of Unnatural Sediment with on-site stabilization and consolidation as an Interim Action at the Site. As noted in the ROD, several permits, certifications or waivers may be required to implement the selected remedy.

We look forward to continuing to work with your agency on this Site in the future. If you should have any questions about this matter, please contact Wendy Carney at (312) 353-6553.

Sincerely,

A handwritten signature in cursive script, appearing to read "Wendy Carney for".

William E. Muno, Director  
Superfund Division

**Record of Decision Summary  
New Jersey Zinc / Mobil Chemical Site  
South Ditch Interim Sediments Action  
DePue, Illinois**

**I. Site Location and Description**

The New Jersey Zinc/Mobil Chemical site (CERCLIS ID Number: ILD 062 340 641) is located in the village of DePue, Bureau County, Illinois. The historic manufacturing site consists of approximately 950 acres within the corporate limits of the Village of DePue ("the Village") and constitutes roughly one-half of the village land mass. Delineation of the extent of contamination from the facility will be completed as the Remedial Investigations ("RIs") proceed and may include over four square miles (2560 acres) within and surrounding the Village. All the privately- and municipally-owned properties within the Village, over 100 acres of land owned by the Illinois Department of Natural Resources ("Illinois DNR"), all of DePue Lake (reported by Illinois DNR to be in excess of 685 surface acres) and additional privately-owned properties outside the corporate limits of the village will likely be included in the delineation studies to establish the extent of contamination.

**II. Site History and Enforcement Activities**

The site has been the location of primary zinc smelting, sulfuric acid manufacturing, paint pigment production, ammonium phosphate fertilizer manufacturing, refining and recovery of secondary metals from zinc ore (i.e., cadmium), secondary zinc smelting and zinc dust production. The site was originally developed in 1905 as a primary zinc smelter by the Mineral Point Zinc Company and was operated continuously in various capacities until 1989. Between 1905 and 1989, portions of the site were owned and operated by the New Jersey Zinc Company, the Mobil Oil Corporation, Gulf & Western Industries, Horsehead Industries and the Zinc Corporation of America. Through various corporate mergers and acquisitions, responsibility for the site has fallen to Viacom International Incorporated, ExxonMobil Corporation and Horsehead Industries. These three companies have formed an entity known as "The DePue Group," which collectively represents the potentially responsible parties ("PRPs") for the site.

Through enforcement of the Clean Air Act and the Clean Water Act, the Illinois Environmental Protection Agency ("Illinois EPA") and the United States Environmental Protection Agency ("U.S. EPA") have had extensive involvement at the site. Many violations of both state and federal environmental regulations were investigated by both agencies. The violations and resulting investigations are beyond the scope of this document and are not enumerated herein.

In 1987, the U.S. EPA evaluated the site under the guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA" or "Superfund") and determined that the site did not qualify for placement on the National Priorities List ("NPL"). However, the placement criteria were modified by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"). In 1992, the

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Illinois EPA reevaluated the site for NPL placement under the new criteria. The site was subsequently proposed for inclusion on the NPL on April 1, 1997 and the listing was finalized on June 9, 1999.

In 1992, the New Jersey Zinc site was the subject of an Expanded Site Investigation conducted by the Illinois EPA. The main areas of contamination discovered at the site were: a waste pile containing in excess of one million tons of primary zinc smelter slag; several waste piles of paint pigment production waste estimated to contain in excess of 200,000 tons of material; the plant property containing the historic processing areas; and various impacted off-site properties. Based on the results of the investigation, an Interim Consent Order (ICO) between the State of Illinois and the DePue Group was negotiated. This ICO was entered in the Circuit Court for the Thirteenth Judicial Circuit Bureau County, Illinois on November 6, 1995. The ICO requires immediate response actions such as enhanced site security, dust control and air monitoring, and control and treatment of certain groundwater and surface water releases. The ICO also requires several Remedial Investigation and Feasibility Studies ("RI/FS"), design of all remedies, and the implementation of selected remedies (i.e., the phosphogypsum<sup>1</sup> waste pile [which exceeds 160 acres], closure of the small vanadium pentoxide disposal area, and completion of the selected remedy for the South Ditch unnatural sediments). The ICO does not contain a commitment for ultimate site-wide remedial action, but instead, envisions a subsequent order to drive final site wide activities.

Specific to this Record of Decision (ROD), the ICO requires an RI/FS and a Remedial Design and Remedial Action ("RD/RA") of the site area known as the South Ditch ("South Ditch Operable Unit 1" or "OU 1").

An additional substantive requirement of the ICO was for the DePue Group to take measures to reduce or preclude discharges of metals-contaminated groundwater to surface waters of the state. At the time of entry of the ICO, the South Ditch received discharges of contaminated groundwater and surface water from the site. These discharges resulted in unnatural sediment, with high concentrations of heavy metals being deposited in the South Ditch. After the entry of the ICO, the DePue Group constructed an Interim Water Treatment Plant to collect and treat the sources of the metals-contaminated sediment. Operation of the Interim Water Treatment Plant will preclude future deposition of metals-contaminated sediment and has substantially reduced the potential for discharges of contaminated groundwater to surface water.

This Interim Action ROD describes the action that will address the mobile sediments contained in the South Ditch and is based on the RI/FS results and a DePue Group contractor proposal. This action is not considered to be the final action in the area surrounding the South Ditch, but is rather the sequestration of potentially mobile, contaminated material in the Illinois River flood plain.

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<sup>1</sup> Calcium sulfate produced from the manufacture of phosphoric acid fertilizer. Phosphogypsum is generated from the reaction (acid conversion) of calcium phosphate by sulfuric acid. The resultant reaction products are calcium sulfate and phosphoric acid.

### **III. Community Participation**

The Draft RI/FS Report, the Proposed Plan for the New Jersey Zinc/Mobil Chemical Site South Ditch Interim Sediments Action and other associated documents were made available to the public in September 2002. The documents are located in the Administrative Record file and information repository at the Illinois EPA's Bureau of Land division file in Springfield, IL and at the Selby Township Library, 101 Depot Street, DePue, IL. The notice of the availability of these documents was published in the LaSalle News Tribune on September 6, the 13 and the 20, 2002, and the Bureau County Republican on September 1, 2002. An extension of the public comment period was requested and the comment period was extended to December 20, 2002. A public hearing was also held on October 9, 2002, to present the Proposed Plan to a broader community audience. At the hearing, representatives of the Illinois EPA answered questions about the remedial alternatives and the Preferred Option presented in the Proposed Plan. The Illinois EPA's responses to the comments received during this period are included in the Responsiveness Summary, which is a part of this ROD.

### **IV. Scope and Role of Operable Unit or Response Action**

Because of the complexity of the environmental issues and waste units at this site, the Illinois EPA has organized the site into five (5) operable units (OUs):

- OU 1: South Ditch Contaminated Sediments.
- OU 2: The Phosphogypsum Stack (the large waste pile north of State Route 29).
- OU 3: The Plant Site.
- OU 4: Off-site Soils.
- OU 5: DePue Lake Sediments and the Flood Plain.

The identification numbers associated with these operable units do not imply any particular priority of action or scheduling. Closure of OU 2 was initiated prior to entry of the ICO and has progressed without interruption since then. OU 3 is the subject of ongoing RI activity and the release of the Phase I Plant Site RI report is expected in the fall of 2003. Planning for RI activities on OU 5 is underway and the Work Plans for the RI of OU 4 are expected in the late spring of 2004.

The subject of the interim remedial action described in this ROD is OU 1, which addresses metals-contaminated sediments. The sediments have been identified as a principle threat waste in the South Ditch because of their acute toxicity to aquatic fauna, the ease with which they could be mobilized, and the inability to reliably contain these sediments in their current location. The sediments exceed the U.S. EPA's acceptable risk range for soil ingestion and dust inhalation for both child trespassers and on-site constructions workers and therefore pose a current and potential risk to human health. The sediments also present a substantial potential ecological risk, based on the near 100 percent mortality of surrogate test organisms within four days of exposure to the sediments. This interim response action for the sediments addresses the principle threats by removing the sediments from the South Ditch and placing them in an environmentally secure unit on the plant site. The remedy described in this ROD is consistent with the

probable remedies for other portions of the site, including OU 5 (discussed below), and will not interfere with those remedies.

This ROD acknowledges that OU 1 is surrounded in its southern two thirds by OU 5 and the northern one third by OU 3. This recognition is the primary reason that this is an interim action. The interim action described in this ROD will be protective of human health and the environment as it relates to removal and management of highly mobile principal threat waste to a secure location. The RI/FSs for OU 3 and OU 5 will provide data to select and design a final remedy of OU 1. The remedies ultimately selected and implemented for OU 3 and OU 5 will encompass the area of OU 1 and will additionally complete remedial efforts directed at OU1.

## **V. Site Characteristics**

The South Ditch is fully within the annual flood plain of DePue Lake and flooding is controlled by the water level of the Illinois River. The northern 120 to 150 feet of the ditch is incised into fill consisting of placed soil and slag material. The remainder of the ditch traverses marshy lowlands adjacent to DePue Lake. In some areas, this "mud flat" is heavily vegetated with wetland tree species and marsh plants. In many other areas, it is denude of vegetation. Historic aerial photo analysis and observations of the ditch indicate the lower reaches of the ditch are a classic delta and the South Ditch is a meandering stream within that delta. The South Ditch empties directly into DePue Lake via a culvert approximately 1600 feet below the origin of the ditch.

Two elongated lagoons previously used for cooling water discharge from the plant site are located adjacent to the west side of the South Ditch. These lagoons are approximately 550 long and are dug into an elevated fill area approximately 10 feet above the flood plain. The lagoons are separated from the South Ditch by approximately 50 to 100 feet of lowland. An area known as the "muni-dump" borders the eastern side of the extreme northern end of the ditch. The name implies municipal involvement in the operation of this area of fill, however, there is little to no information in support of that conclusion. There are some anecdotal indications that local residents used the area for random dumping, but the predominance of material found thus far in the area appears to be primary zinc smelter slag, spent refractory and demolition debris from the plant site.

The RI/FS for OU 1 was conducted between 1995 and 1997. The RI indicated that 7,900 cubic yards of unnatural sediment exist within the study area, varying in depth from 2.6 to 6.8 feet and from 12 feet to greater than 45 feet in width. The boundaries of the RI study area and the location of the unnatural sediment are shown on Attachment A of this ROD. In addition to this quantity determination, chemical and screening risk assessment data was collected, an assessment of water table interactions was conducted, and general observations were made on the local ecology. The data gathered in the RI along with a comparison to the Ontario and British Columbia Provincial Sediment Guidelines is summarized in Table 1.



**Table 1**  
**Summary of Metals Analysis of Sediments**

Metal	South Ditch Minimum Concentration (mg/kg)	South Ditch Maximum Concentration (mg/kg)	Turner Lake (Background) Average Concentration (mg/kg)	Ontario & British Columbia Provincial Guidelines (mg/kg)		Frequency that South Ditch Sediments Exceeded Sediment Guidelines *
				LEL	SEL	
<b>Arsenic</b>	7.8	82	8.1	6	33	13/13 (LEL)
<b>Beryllium</b>	ND	2.8	0.9	NA	NA	NA
<b>Cadmium</b>	32.4	910	5.2	0.6	10	13/13 (LEL), 13/13 (SEL)
<b>Chromium</b>	ND	78.2	40.4	26	110	NA
<b>Cobalt</b>	8.1	70.2	10	50	NA	9/13 (LEL)
<b>Copper</b>	144	97,700	41.2	16	110	13/13 (LEL), 13/13 (SEL)
<b>Lead</b>	125	3,440	48.7	31	250	13/13 (LEL), 12/13 (SEL)
<b>Manganese</b>	433	3,130	572	460	1,100	13/13 (LEL), 13/13 (SEL)
<b>Mercury</b>	ND	4.6	ND	0.2	2.0	12/13 (LEL) 1/13 (SEL)
<b>Nickel</b>	11.6	69.4	37.4	16	75	13/13 (LEL)
<b>Selenium</b>	ND	4.6	0.65	5	NA	NA
<b>Silver</b>	ND	144	ND	0.5	NA	13/13 (LEL)
<b>Vanadium</b>	5	38	26.5	NA	NA	NA
<b>Zinc</b>	3,840	204,000	240	120	820	13/13 (LEL), 13/13 (SEL)

ND - Not Detected    NA - Not Applicable or Not Available    LEL - Lowest Effect Level    SEL - Severe Effect Level

\* The comparison against the Provincial Sediment Guidelines was only done for samples in the top six inches of the sediment column.

**Other more general findings of the RI include:**

- The unnatural sediment contains elevated concentrations of metals, compared to background samples collected at Turner Lake. The analytical results are summarized in Table 1 at the end of this section.
- Groundwater in portions of the South Ditch is upwelling, resulting in groundwater discharges to the stream.
- The unnatural sediment is acutely toxic to specific test organisms.
- Beaver inhabit the area of the South Ditch.
- Sport and forage fish, great blue herons, egrets and various other waterfowl including wood ducks, mallard ducks and Canada geese inhabit DePue Lake, which receives discharges from the South Ditch.
- Vegetation in some of the areas of the South Ditch is sparse (i.e., stressed or non-existent).

**VI. Current and Potential Future Site and Resource Uses**

The South Ditch is fully within the 100-year flood plain and most of the area is within the annual flood plain of DePue Lake, with water levels controlled by those in the Illinois River. This area of the site can reasonably be expected to remain a wetland setting. Any future land use will likely be determined more by the physical geographic setting than by residual contamination. Any residual contamination remaining after this interim action will be assessed during the OU 5 component of the RI. If necessary, remedial alternatives will be proposed in subsequent Feasibility Studies and will be selected through the Proposed Plan and ROD process.

**VII. Summary of Site Risks**

A traditional Baseline Risk Assessment (BRA) was not conducted as part of the South Ditch RI process. The BRA was deferred to the OU 5 RI. This deferral will insure that any final remedy selected for the South Ditch OU 1 is consistent with the more global lake area remedy(s). A Qualitative Human Health Risk Assessment (Screening Risk Assessment or SRA) and a Screening Ecological Risk Assessment were conducted as part of the South Ditch RI. The SRA provides a conservative estimate of what risk the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the screening risk assessment for this site.

As the South Ditch OU1 is fully within the 100-year flood plain, future residential land use was not considered a reasonable possibility. Therefore, the residential land use scenario was not considered in the SRA. Industrial land use was also not considered a reasonable possibility. Two alternatives that were considered reasonably likely to occur

(prior to selection of final remedies for the entire area) were the child trespasser scenario and the construction worker scenario.

The child trespasser scenario was developed to evaluate the risk associated with exposure from inhalation and ingestion of South Ditch sediments by a child who is six to 12 years old and uses the area four hours per day, 50 days per year. More specific information and detail on the assumptions made for this SRA are contained in the South Ditch Focused Remedial Investigation Report.

The construction worker scenario made no adjustments from the assumptions utilized by the Illinois EPA in developing the Tiered Approach to Cleanup Objectives (TACO). The TACO document and the process of evaluating the child trespasser scenario are consistent with U.S. EPA Risk Assessment Guidance. Based on the results of the RI, the SRA determined that the contaminants of concern for the child trespasser scenario were arsenic, copper and lead. The contaminants of concern for the construction worker scenario were arsenic, cadmium, copper, lead and zinc.

U.S. EPA Risk Assessment guidance considers two types of risk: cancer risk and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as a probability. For example, a "1 in 1,000,000 increased chance" (expressed as  $1 \times 10^{-6}$ ). In other words, for every 1,000,000 people that are exposed to the site contaminants, one additional cancer case may occur. This cancer case would be in addition to the number of cancer cases normally expected in a population of 1,000,000.

The U.S. EPA considers risks between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$  (between 1 in a million and 1 in ten thousand) to be within the acceptable risk range. The Illinois EPA considers a risk of  $1 \times 10^{-6}$  a goal and evaluates risks greater than  $1 \times 10^{-6}$  a site-by-site basis. In the child trespasser scenario at the South Ditch, only arsenic exceeds the cancer risk level of  $1 \times 10^{-6}$ , presenting a potential risk of  $1.49 \times 10^{-6}$ .

For non-cancer health effects, the U.S. EPA calculates a "hazard index" (HI). This index is a comparison of the concentration present at the site and the concentration below which non-cancer health effects are no longer expected. For example, the highest arsenic concentration at the site is 82 parts per million. The concentration for arsenic below which no health effect would be expected for a construction worker is 61 parts per million. The hazard index is calculated by dividing 82 by 61, which equals 1.34. Using this comparison, any contaminant at the site with a hazard index greater than one is of some concern.

For non-cancer risk in the child trespasser scenario, copper exceeded the hazard index of 1. For non-cancer risk calculations in the construction worker scenario, arsenic, cadmium, copper and zinc exceeded the hazard index of 1. The hazard index data for both the child trespasser and construction worker scenarios are summarized in Table 2 below.

**Table 2  
Hazard Index Summary**

Compound	Maximum South Ditch Concentration mg/kg	Concentration Where HI=1 Ingestion Pathway mg/kg	Derived Hazard Index
<b>Construction Worker Scenario</b>			
Arsenic	82	61	1.34
Cadmium	910	200	4.55
Copper	97,700	8,200	11.9
Zinc	204,000	61,000	3.34
<b>Child Trespasser Scenario</b>			
Copper	97,700	47,000	2.1

Lead concentrations exceeded the 400 mg/kg Soil Remediation Objectives for all land use scenarios in Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) (35 IAC Part 724) by a factor of 8.6. (3,440 mg/kg). While TACO is only a To Be Considered regulation and not an Applicable or Relevant and Appropriate Requirement (ARAR) for this site the value for lead used in TACO parallels the U.S.EPA Soil Screening Level of 400 mg/kg total lead.

A screening ecological risk assessment was performed as part of the Focused South Ditch RI Report. The assessment used a qualitative approach through a combination of direct testing and review of available literature. The Focused South Ditch RI summarizes available information on the effects of metals on ecological receptors such as mammals, birds, reptiles and amphibians, fish, invertebrates and plants. It also reports the results of direct benthic organism surrogate testing. The South Ditch sediment metals concentrations were also compared to the Ontario and British Columbia Provincial Guidelines for aquatic sediment quality (Ontario Sediment Guidelines). These guidelines are widely accepted for ecological evaluations.

According to the RI, beaver frequent the South Ditch area and a number of sport and forage fish, piscivorous (fish eating) birds and waterfowl inhabit DePue Lake, which receives the South Ditch discharge. The lake is also a significant recreational resource for the village of DePue. Indications of raccoon, muskrat and deer have been observed in the area of the South Ditch. This evidence included raccoon tracks and open mussel shells

(likely from raccoon feeding), deer tracks in the mud flats adjacent to the South Ditch and visual sightings of muskrat in a pond adjacent to the South Ditch. Great blue heron, great egrets, bald eagles and white pelicans have also been seen feeding in DePue Lake near the entry point of the South Ditch. An unidentified species of gar has been observed near the northern-most extent of the South Ditch.

In addition to the comparison of South Ditch sediments against published sediment quality guidelines, direct testing of the survivability of surrogate benthic organisms was conducted. Midge larvae (*Chironomus tentans*) and scud (*Hyaella azteca*) were selected as the surrogates, because they live in the benthic environment (the top few inches of lake sediment). Midge larvae and scud, or very similar species, would be expected to occur in DePue Lake sediments and they are readily available for testing.

The results of the benthic organism surrogate testing indicated a 100 percent mortality rate within four days of scud being exposed to South Ditch sediments from all eight sample locations. One hundred percent mortality within four days was also reported for midge exposed to samples from seven of the eight locations. The eighth location showed an 85 percent mortality rate after four days for midge. These results indicate acute toxicity of South Ditch sediment to the surrogate test organisms and a distinct possibility that the sediment represents a significant threat to benthic organisms likely to inhabit the area of the South Ditch. Numerous fish species, great blue herons, egrets and certain other waterfowl rely on these benthic organisms as food sources. In addition, some waterfowl, (e.g., mallard ducks) are dabblers, and could ingest the contaminated sediments.

Based on the risks identified in the qualitative human health risk assessment and the screening ecological risk assessment, the interim response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

### **VIII. Remedial Action Objectives**

Remedial action objectives provide the foundation upon which remediation alternatives are developed. Remedial action objectives should reflect the U.S. EPA's remedy selection expectations, as presented in CERCLA and the National Contingency Plan ("NCP"). CERCLA establishes a preference for remedial actions that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances, pollutants and contaminants [42U.S.C. §9621(b)]. Furthermore, CERCLA states that the U.S. EPA shall select a remedial action that is protective of human health and the environment, that is cost effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable [42 U.S.C. §9621(b)]. The NCP provides that where practicable, the U.S. EPA expects to treat principle threats, employ engineering controls (e.g. containment) for low-level threats or where treatment is impracticable, use institutional controls to supplement engineering controls, consider using innovative technology and restore usable groundwater to beneficial uses wherever practicable [40 C.F.R. §300.430(a)(1)(iii)] The remedial action objectives should reflect the reasonably anticipated or intended future use

of the land. As the physical geographic setting of the south ditch prohibits residential development of the site, and considering the physical nature and setting of the site, remediation to protect future site construction workers and child trespassers, along with mitigation of ecological exposure to the south ditch sediments are appropriate.

The following Remedial Action Objectives were established in the draft Focused FS for the South Ditch OU 1 Interim Action:

- Mitigate the potential for flood water and water discharges to the South Ditch to mobilize the unnatural sediment;
- Mitigate the potential acute exposure risk [SIC] to sensitive ecological and human receptors via contact with the unnatural sediment;
- Mitigate the potential for the on-site trespasser; and
- Be compatible with future site-wide remedies.

The proposed action does not contain specific chemical targets, but rather proposes to remove the unnatural sediment identified during the focused South Ditch RI and shown on Attachment A to this ROD. While the unnatural sediment is visually discernable from native material a visual standard is not believed appropriate due to the physical and color changes expected as a result of disturbance during the dredging action. It is understood that additional quantities of similar, less mobile, unnatural sediment likely exist immediately adjacent to the OU 1 (the south ditch) boundaries. The areas outside the boundaries of OU 1 will be addressed in the RI/FS and remedy selection process for OU 5 (DePue Lake).

## **IX. Description of Alternatives**

The draft Feasibility Study ("FS") and subsequent documents presented four primary remedial action alternatives with three sub-alternatives for detailed review. The four primary alternatives evaluated included: 1) No Action (Natural Recovery) with Monitoring; 2) Enhanced Natural Recovery; 3) an Above Grade Cap; and 4) Removal of the Unnatural Sediment with three sub-alternatives. Alternative #4 included Removal with Direct Reuse of the sediment, Removal of the Sediment with On-Site Consolidation, and Removal of the Sediment with Off-Site Disposal. The FS also evaluated a sub-aqueous capping scenario with three sub-alternatives related to water management after cap placement.

The four primary remedial action alternatives and three sub-alternatives carried through full evaluation were:

**Alternative 1: No Action (Natural Recovery) with Monitoring**

**Alternative 2: Enhanced Natural Recovery with Influent Surface Water Diversion**

**Alternative 3: Above-Grade Cap**

## **Alternative 4: Removal of Unnatural Sediment with Sub-Alternatives**

### **Alternative 4A: Removal of Unnatural Sediment with Direct Use**

### **Alternative 4B: Removal of Unnatural Sediment with On-Site Consolidation**

### **Alternative 4C: Removal of Unnatural Sediment with Off-Site Disposal**

**Common Elements:** All the remedial alternatives include common elements of short- and long-term monitoring. The short-term monitoring would include health and safety monitoring to ensure that site workers are not exposed to undue or unexpected risk and quality control monitoring to confirm the attainment of relevant performance criteria. Long-term monitoring would verify that the remedy performs as expected over time and would allow timely maintenance of physical components of the alternatives. All long-term monitoring referenced in this document assumes a 30-year monitoring period, as did the draft South Ditch focused FS. The DePue Group included a monitoring provision in the "No Action" alternative, although monitoring is generally not considered in this alternative. The Illinois EPA and the U.S. EPA do not oppose the monitoring provision.

All alternatives except Alternative 1, No Action (Natural Recovery), include the common elements of institutional controls and certain surface-water control measures. The institutional controls would include warning signs and limited fencing. Additional institutional controls, such as deed restrictions, are not necessary on a short-term basis, but may be appropriate in the long term. Selection and implementation of long-term institutional controls is deferred, pending selection of final remedies for the entire site. Long-term institutional controls must be compatible with site-wide remedies. Alternatives 4B and 4C included stabilization of unnatural sediments.

### **Alternative 1: No Action (Natural Recovery)**

This is the baseline condition required by the NCP for comparison purposes, and it assumes that no direct remedial measures would be implemented at the site. This alternative relies solely on unaided natural recovery (natural siltation) of the study area, but as developed by the DePue Group and discussed above, does include both short- and long-term monitoring of the study area.

Estimated Capital Cost: \$0  
Estimated Annual O&M Cost: \$21,665  
Estimated Present Net Worth: \$429,000  
Estimated Months to Construct: 0  
Estimated Time for Natural Recover: 30 years

The cost in this and all following Alternatives are taken from the 1997 draft Focused FS and no attempt to adjust for inflation has been made.

### **Alternative 2: Enhanced Natural Recovery with Influent Surface Water Diversion**

This alternative would involve construction of a series of check dams across the study area, with surface-water control features to retain the unnatural sediment within the study area and increase the natural deposition of silt over the study area. Additionally, Alternative 2 would include the common elements of monitoring and institutional controls.

Estimated Capital Cost: \$608,000  
Estimated Annual O&M Cost: \$28,662  
Estimated Present Net Worth: \$1,176,000  
Estimated Months to Construct: < 6 months  
Estimated Time for Natural Recover: 5 to 15 years

### **Alternative 3: Above-Grade Cap**

This alternative would redirect surface water flows to a new drainage way to replace the South Ditch in-situ (in-place) stabilization of the unnatural sediment. A solid waste landfill style above-grade cap would be constructed over the stabilized unnatural sediment along the current path of the South Ditch. Additionally, Alternative 3 would include the common elements of monitoring and institutional controls.

Estimated Capital Cost: \$946,000  
Estimated Annual O&M Cost: \$22,330  
Estimated Present Net Worth: \$1,387,000  
Estimated Months to Construct: < 6 months

### **Alternative 4: Removal of Unnatural Sediment with Sub-Alternatives**

Each sub-alternative under the Removal of Unnatural Sediment has the common elements of short-term surface water diversion, short-term spring water diversion, removal of the unnatural sediment (via mechanical and / or hydraulic dredging) and dewatering of the removed sediment. The primary differences between sub-alternatives 4A, 4B and 4C are the dispositions of the unnatural sediment following removal and dewatering.

Each sub-alternative in Alternative 4 would comply with the requirements of Section 404 of the Federal Water Pollution Control Act (also known as the "Clean Water Act" or CWA) via U.S. Army Corps of Engineers Nationwide Permit 38 (Cleanup of Hazardous and Toxic Waste), 35 Illinois Administrative Code 304, and Section 401 of the CWA. Through the testing procedures outlined in Section 401 of the CWA, specific sediment and water management techniques and materials will be selected to comply with Best Management Practices, thus minimizing any potential non-compliance with Section 401.

The existing and operating Interim Water Treatment Plant (IWTP) will be utilized to the maximum extent practical (to the limit of available capacity) to further reduce any non-compliance potential. Current IWTP discharges are consistent with all applicable state and federal regulations.



#### **Alternative 4A: Removal of Unnatural Sediment with Direct Use**

Following failure to show progress on resolution of differences on the South Ditch Focused FS, this alternative became unavailable because of a withdrawal of interest by the potential user (a local high zinc and copper micro-nutrient fertilizer manufacturer).

#### **Alternative 4B: Removal of Unnatural Sediment with On-Site Consolidation**

This alternative involves the common elements discussed above with construction of a Corrective Action Management Unit (CAMU) to contain the physically- and chemically-stabilized unnatural sediment. This CAMU would be constructed consistent with 35 Illinois Administrative Code 724. The unnatural sediment would be held in the on-site CAMU, pending selection of final remedies for the plant site. The CAMU would be constructed over an area of contaminated soil and ground water, utilizing a recompacted clay layer, a high-density polyethylene (HDPE) or similar liner and an aggregate drainage layer as a liner under the stabilized sediment. The ICU would be covered with a recompacted clay layer over the stabilized sediment, with the clay cover layer designed to shed water away from the interior of the CAMU. This clay cover layer would be monitored to insure maintenance of protectiveness. Any water collected in the aggregate drainage layer would be periodically transferred to the existing Interim Water Treatment Plant for treatment.

Estimated Capital Cost: \$1,677,000

Estimated Annual O&M Cost: \$11,000

Estimated Present Net Worth: \$1,895,000

Estimated Months to Construct: <6 months

#### **Alternative 4C: Removal of Unnatural Sediment with Off-Site Disposal**

This alternative utilizes the common elements discussed above and would ship the stabilized unnatural sediment off-site for disposal at a permitted, compliant, non-hazardous waste landfill.

Estimated Capital Cost: \$2,404,000

Estimated Annual O&M Cost: \$0

Estimated Present Net Worth: \$2,402,000

Estimated Months to Construct: < 6 months

### **X. Comparative Analysis of Alternatives**

Nine criteria are used to evaluate remediation alternatives, individually and against each other, to select a remedy. The nine evaluation criteria are: (1) overall protection of human health and the environment; (2) compliance with Applicable or Relevant and Appropriate Requirements (ARARs); (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state/support agency acceptance; and (9) community acceptance [40 C.F.R. §300.430(e)(9)(iii)]. This section of the ROD profiles the relative performance of each alternative against the nine criteria and compares

the alternative to the other options under consideration. The nine evaluation criteria are discussed below. A "Detailed Analysis of Alternatives" is contained in the draft FS.

**1. Overall Protection of Human Health and the Environment** determines whether an alternative eliminates, reduces or controls threats to public health and the environment through institutional controls, engineering controls or treatment. Alternatives #1 and #2 are not protective of human health and the environment; Alternative #2 was not considered further as a result. Alternative #1 was carried forward only in consideration of guidance and policy to document the baseline condition and the impacts of no action. Alternative #3 effectively eliminates the short-term human health risks posed by the South Ditch Sediment and substantially reduces the environmental risk. Alternative #3 does not fully mitigate the flood migration of the sediments and is therefore is not protective. Alternative #3 is not carried any further through this analysis. Alternative #4 (with it's sub-alternatives) is protective of human health and the environment and fully satisfies the remedial action objectives.

**2. Compliance with ARARs** evaluates whether the alternative meets federal and state environmental statutes, regulations and other requirements that pertain to the site or whether a waiver is justified. Alternative #3 does not meet state and federal ARARs relating to construction of waste disposal units in the flood plain and allowing monitoring of the effectiveness of the containment, nor does this alternative justify invocation of an ARAR waiver, therefore it is not carried forward through further detailed analysis. Alternative #4-A does not currently comply with ARARs and the interest by the potential (a former local fertilizer manufacturer) user was withdrawn prior to presentation of the Proposed Plan. Alternative #4-A is therefore not carried forward in further analysis in this ROD.

Alternatives #4-B and #4-C can comply with ARARs or, through the required treatability studies, may produce data that could substantiate for use as part of a Technical Impracticability waiver, pursuant to section 121(d)4(C) of CERCLA if such were to become available, or validate the use of other optional avenues of administrative relief.

Alternative #4-B with administrative relief from ARARs is considered a contingent remedy to Alternative #4-B with full ARAR compliance. The potential need for ARAR relief, the administrative encumbrances currently being encountered by the Illinois EPA in accessing ARAR waiver authority, and various alternative mechanisms to access ARAR relief were topics discussed in the public presentation of the Proposed Plan, and are a reasonable outgrowth of the overall remedy selected in this ROD, an Explanation of Significant Difference (ESD) will be completed if Alternative #4-B with administrative relief from ARARs is implemented. No further public comment, hearings, etc will be necessary.

A list of the ARARs identified for the selected remedy is located in Section XIII of this document. And alternatives #1, #2 and #3 are dropped from further discussion due to their failure to meet the threshold criteria of Protectiveness and ARAR compliance.

**3. Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time. At this site the concerns of Long-term Effectiveness and Permanence relate to the aggressive, highly erosive setting presented by changing water levels, wave action, flooding and other forces within the dynamic area of the annual flood plain of DePue Lake and the Illinois River.

Alternatives #4-B and #4-C remove the highly mobile unnatural South Ditch sediment from the environment and fully meet the criteria of Long-term Effectiveness. The on-site interim containment cell in Alternative 4-B is not proposed to be a permanent stand-alone unit, but for the purposes of this Interim Action meets the criteria of Permanence. Alternative #4-C, which utilizes off-site disposal, meets the criterion of Permanence.

**4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment and the amount of contamination present.

Alternatives #4-B and #4-C both offer substantial reduction in Mobility and Volume through removal of the unnatural sediment from the South Ditch with dewatering, and with the use of appropriate admixtures to dry and stabilize the unnatural sediment, can reduce Toxicity.

**5. Short-term Effectiveness** considers the length of time needed to implement an alternative and the risk the alternative poses to workers, residents and the environment during implementation. All of the alternatives carried forward through the threshold criteria of Overall Protection of Human Health and the Environment and Compliance with ARARs meet the criteria of Short-term Effectiveness equally well, except Alternative #1 which is carried forward as a matter of comparison. Alternatives #4-B, and #4-C can each be completed in less than 6 months of actual construction time.

**6. Implementability** considers the technical and administrative feasibility of implementing the alternative such as relative availability of goods and services. Alternatives #4-B and #4-C are readily implementable, and can be constructed using standard construction techniques and materials. However, construction of each is weather dependent and must be undertaken during the summer construction season. Alternative #4-B would require construction of support structures in the fall of the year preceding the actual removal of sediments from the South Ditch to utilize the full summer season for dredging activity.

Some question exist regarding the ability of Alternatives #4-B and #4-C to comply with ARARs and this may affect the implementability of either of these alternatives. The ARAR compliance and implementability issue cannot be assessed until a series of treatability studies are completed. These treatability studies are expected to be completed within 90 days following execution of this ROD.

**7. Cost** includes estimated capital and operation and maintenance cost, as well as present worth cost. Present worth cost is the total cost of an alternative over time. The costs presented here and in the tables were extracted from the 1997 draft Focused Feasibility Study. No attempt has been made to adjust the costs for inflation or the impacts of changes in regulations. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

**Summary Table of Alternative Cost and Time to Complete**

Alternative #	Alternative #1	Alternative #4B	Alternative #4C
Estimated Capitol Cost:	\$0	\$1,677,000	\$2,404,000
Estimated Annual O&M Cost:	\$21,665	\$11,000	\$0
Estimated Present Net Worth:	\$429,000	\$1,895,000	\$2,402,000
Estimated Time to Construct:	0 years	< 6 months	< 6 months
Estimated Time to fully implement remedy	30 years	< 6 months	< 6 months

A summary of capitol and operation and maintenance cost for each alternative is presented in the **Summary Table of Alternative Cost and Time to Complete** located at the end of this section of the ROD.

**8. State/Support Agency Acceptance** considers whether the U.S.EPA agrees with the state analyses and the recommendations of the RI/FS and the Proposed Plan. The U.S. EPA has reviewed this ROD and supports the Preferred Remedial Alternative.

**9. Community Acceptance** considers whether the local community agrees with the state's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance. The Proposed Plan, presented in a formal public hearing, indicated that Alternative #4B was the option preferred by the Illinois EPA and the U.S. EPA.

The Board of Trustees of the Village of DePue and the Bureau County Board submitted comments in the form of Board Resolutions. These two resolutions supported Alternative #4C and expressed opposition to Alternative #4B. Neither of the resolutions indicated why the Boards supported Alternative #4C and opposed the Illinois EPA's preferred alternative (Alternative #4B). Response to the Board Resolutions is contained in Response to Comment #1 in the Responsiveness Summary attached to this ROD.

A number of comments indicated concerns about the potential for contaminant releases during implementation of the remedy. The Illinois EPA can generally summarize the concerns as issues covered during work plan development and remedy implementation oversight. These comments are also addressed in the Responsiveness Summary.

One member of the DePue group (ViaCom) submitted a series of comments about ARAR waivers, the Illinois EPA's inability to issue those waivers and the presumed degree of difficulty in implementing the project without those waivers. All of these comments are addressed in the attached Responsiveness Summary.

The Illinois Dept. of Natural Resources expressed their support for the proposed interim action. The remaining comments were related to remedy implementation and while they have some impact on design and construction, they do not impact remedy selection.

## **XI. Principle Threat Waste**

The unnatural sediments meet the definition of a Principle threat waste because they are highly toxic and easily mobilized and will be removed from the South Ditch OU 1 as part of the interim remedial action selected in this ROD. Those Principle Threat wastes will be dewatered, chemically and physically stabilized and transferred to an environmentally secure containment cell, pending incorporation into a final remedy for one or more waste units existing on site and containing significantly larger volumes of chemically similar material.

## **XII. Selected Remedy**

### **Summary of the Rationale for the Selected Remedy:**

The selected Interim Action remedy for the New Jersey Zinc/Mobil Chemical site, South Ditch Operable Unit 1, is **Alternative # 4B Removal of Unnatural Sediment with On-Site Consolidation**, as generally discussed in Section IX. This is the Preferred Alternative presented in the Proposed Plan. The selection of this interim action is based on full consideration of the public comments received on the Proposed Plan.

The selected alternative provides the best balance of trade-offs (with respect to the balancing and modifying criteria) for the following reasons:

The selected alternative is protective and can be conducted in such a way as to comply with ARARs.

Long Term Effectiveness, while a consideration, is not a mandatory component in selection of an Interim Action Remedy. However, Long Term Effectiveness is plausible with this alternative, because the principle threat will have been removed from the dynamic Lake DePue environment and contained in a temporary, but secure on-site containment unit. Ultimately, the unnatural sediment will be managed in concert with much larger quantities of chemically similar materials in a final remedy for one or more of the on-site operable units. Long Term Effectiveness must be considered in the selection of any potential final remedy.

Reduction of Toxicity, Mobility, or Volume Through Treatment will be accomplished by removing the unnatural sediment from the current highly mobile setting and dewatering the removed sediment. The dewatered sediment would then be physically stabilized and receive some additional chemical fixation, through the addition of the same stabilizing

agents; Chemical fixation is not a requirement of this ROD but only an ancillary benefit of most physical stabilization agents. Full chemical stabilization will be a consideration for the final remedy of the unnatural sediments and other on-site waste. The volume of unnatural sediments may not be reduced substantially, however, this cannot be fully assessed until completion of treatability studies.

Reductions in Toxicity, Mobility or Volume through Treatment are not a driving consideration during the selection process of an Interim Action. This issue can be deferred until selection of the final remedy, and to some extent, this will be done in this case. By maintaining the material in a discrete storage unit with much larger quantities of chemically similar material, the unnatural sediment remains a candidate for technologies such as metals recovery. This alternative and other resource-recovery alternatives may prove viable during the remedy selection process for other units such as the primary zinc smelter slag pile.

Short Term Effectiveness is provided by the removal of the material from the flood plain setting and transferring it to a secure unit. The dredging action will remove the material from the flood plain and the Lake DePue system, preventing any future ecological exposure. Placement of the unnatural sediment in a secure unit will also restrict access to that material and isolate it from the child trespasser. During the actual interim remedial action, the potential for exposure of construction workers to the unnatural sediment will increase; however, that exposure can be managed by rigorous attention to the required health and safety plan and by following good construction practices.

Implementability of the Selected Alternative can be achieved. Until the treatability studies discussed below have been completed, the degree of difficulty associated with implementability cannot be fully assessed. The PRPs challenge the implementability of the alternative without ARAR waivers. This challenge is premature and primarily related to their second challenge of cost effectiveness addressed below. The Illinois EPA remains convinced that Alternative #4B can be implemented. The only question is the degree of treatment necessary for decant water prior to return to the South Ditch work area. The degree of treatment drives the cost of treatment and impacts the duration of field activity associated with the dredging and dewatering efforts. The Illinois EPA will use its best efforts to acquire ARAR waiver authority and to exercise that authority if warranted to insure implementability and expedite the project. If, due to issues of technical impracticability as verified by treatability studies, the implementability of the selected remedy is jeopardized, the Illinois EPA further commits to reopen this ROD for selection of another of the alternatives, proposal of a new remedy entirely, or any other action which will facilitate remediation of the South Ditch unnatural sediments. If this ROD is reopened in this fashion, an Explanation of Significant Difference, ROD amendment or other appropriate administrative document will be completed and the community participation requirements of the NCP will be met.

As an alternative to obtaining a waiver of the ARARs, the PRPs can apply to the Illinois Pollution Control Board (PCB) for an adjusted standard for those concentration limits it can justify to the PCB warrant such relief. The Illinois EPA does not presently support

nor object to such relief, as the PRPs have not made such a proposal and supplied supporting information for such relief. The PRPs would need to provide such justification as required under all applicable PCB regulations, as well as justification provided by treatability studies and other research in order to support such a request.

Cost of the Selected Alternative is reasonable, considering the substantial risk reduction that will be achieved so long as water treatment requirements remain within the limits of technical practicality.

U.S. EPA Acceptance of the Selected Alternative has been acquired.

Community Acceptance of Alternative #4B was the subject of many comments. The Illinois EPA proposed Alternative #4B as the suggested alternative to the remedy. Several commenters suggested Alternative #4C as their preference, however, there was no specific rationale for their support of the off-site disposal alternative (#4C) over the on-site consolidation proposal (#4B). As discussed in the attached Responsiveness Summary, the addition of the South Ditch unnatural sediments to the existing on-site waste is expected to produce no more than a 0.4 to 1.0 percent increase in material remaining on-site after all remedies are completed. A second group of comments discussed ARAR waiver issues, these are addressed to a limited extent earlier in this section in the discussion of Implementability and further in the responsiveness summary attached. The remaining public comments were primarily focused on issues of implementation and are generally valid considerations for design of the remedy and Illinois EPA's oversight of the project. A full summary of public comments and the Illinois EPA's responses are contained in the Responsiveness Summary attached to this ROD.

#### **Description of the Selected Remedy:**

Based on the rationale presented above, Alternative #4B is the Selected Remedy for the South Ditch Unnatural Sediments Operable Unit 1 Interim Action at the New Jersey Zinc/Mobil Chemical site. Alternative #4B consists of the following major remedy components:

#### **1) Treatability Studies**

Prior to the design of the Unnatural Sediments Interim Action, a series of treatability studies will be necessary to determine the following:

- Appropriate admixtures and dosage rates to achieve adequate contaminant removal from discharge water streams.
- Retention (settling) time required in decant basins.
- Assessment of physical treatment enhancements likely to assist in meeting discharge criteria (i.e. high volume sand filtration).
- Pilot evaluations of mechanical techniques for high solids sediment removal.
- Physical stabilization and chemical fixation agents, mixing rates and curing times required prior to placement of sediment in the Interim Containment Cell.
- Silt fence material selection, placement and maintenance frequency.

- Cost analysis of the various alternatives that produce favorable results.

The implementation of the Treatability Studies will be consistent with work plans, quality assurance/quality control documentation and schedules to be reviewed and approved by the Illinois EPA.

## **2) Design of Interim Unnatural Sediments Action**

It is likely that the design of this Interim Action will proceed in two distinct design phases. Phase 1 will cover design of the settling basins (decant ponds) and the interim containment cell. Phase 2 will detail the mechanics of the hydraulic dredging of unnatural sediments, material handling, placement of the stabilized unnatural sediment into the interim containment cell and the capping of the interim containment cell. This bifurcated design is required so that construction of the settling basins and the interim containment cell can be completed in the fall and early winter of 2003 and dredging of the sediment can begin as soon as weather allows in the early summer of 2004. By constructing the support structures in the fall of 2003, the project will be less impacted by an inordinately wet spring in 2004, if such were to occur. Certain components of the interim action design documents discussed below may be accomplished in the form of Work Plans, if so chosen by the implementing bodies. This option will facilitate more rapid remedy implementation, if the responsible parties propose a "design and build" contractor, as opposed to separate design and construction firms.

**Phase 1 - Design of the settling basins (decant ponds)** will incorporate the results of the treatability studies to insure the size of the ponds will be adequate to allow the required retention time and achieve appropriate solids removal. The design must also make provisions for the incorporation of appropriate admixtures required to achieve adequate removal of dissolved and slow settling contaminants from the decant water return flow. It is presumed that physical and chemical stabilization agents will be mechanically added to the unnatural sediment prior to removal of that material from the settling lagoons. The design of the basins must allow for incorporation of those admixtures without degrading the containment component of the basins. In addition, the minimum design standards stipulated in the ARARs must be met by the basin designs.

The results of the stabilization admixture selection component of the treatability studies will allow the bulk volume of unnatural sediment to be estimated after it has been dewatered and the stabilization and fixation materials have been added. This bulk volume will be applied to the design of the interim containment cell to insure adequate, but not excessive, cell size is prepared. Additionally, the design of the interim containment cell will comply with the recently promulgated Corrective Action Management Unit (CAMU) regulations as they relate to minimum design standards in addition to all other indicated ARARs.

The interim containment cell will be constructed over contaminated soil in an area of preexisting groundwater contamination. The bottom and sidewalls of the cell will generally consist of a graded layer of low-permeability soil, a synthetic impermeable



liner and an aggregate drainage layer under the stabilized unnatural sediments. The slope of the bottom and the aggregate drainage layer will be installed so that leachate within the interim containment cell can be extracted without disrupting the cell and in a manner that will maintain the saturated thickness at less than 30 centimeters (slightly less than 12 inches). It is currently anticipated that the interim containment cell will be constructed near the northwest corner of the primary zinc smelter slag pile. The design and placement of the containment cell must consider the results of the draft Phase I Soil and Groundwater Remedial Investigation Report to insure the cell will be compatible with future investigative and remedial efforts at the site, consistent with the requirements of the Interim Consent Order.

**Phase 2** – The design of the mechanical/hydraulic dredging, material handling, material placement in the interim containment cell and capping of the cell can be deferred until late 2003 or early 2004. The remedial design will be based on the results of the silt fence material selection and management component of the treatability study and will obligate the implementing contractor to set appropriate silt fence material at specified maximum separation distances. The design will also establish cleaning, maintenance and replacement frequencies for the silt fences. The minimum liquid retention times determined in the treatability studies will dictate the appropriate size of the settling basin(s) in the design. The minimum retention times will also determine the maximum flow rates of hydraulic dredge material transferred to the settling basins and the maximum number of cubic yards of mechanically dredged material that can be managed during a given time period. If high solids mechanical dredging is a significant component of the implementation plan the design will set minimum and / or maximum standards (as appropriate) for types of equipment, fall back of material to the dredge work area, equipment loading rates (pounds per square inch) on areas surrounding the South Ditch, and material handling techniques to be utilized to transfer dredge spoil to the stabilization area. Additionally all other applicable criteria contained in the Remedial Design / Remedial Action guidance will be addressed.

The selection of specific admixtures (e.g., kiln dust, fly ash, proprietary drying agents and metals fixation compounds), mixing rates and curing times will be determined in the treatability studies. The remedial design will produce the most expeditious mixing procedures and will suggest appropriate end point measurements.

The interim action design documents will provide direction on the acceptable mechanical and hydraulic dredging techniques to be employed during implementation, as well as the appropriate dredging sequence to be employed. The mechanisms to be used for the transfer of unnatural sediment material from the working dredge cells to the settling basins and the transfer rates of unnatural sediment to the settling basins will be included. The design documents will also project return water flow volumes and provide generalized information on mechanisms to remove stabilized sediment from the settling basins and to transfer the stabilized sediment from the settling basins to the interim containment cell. Techniques of placing stabilized unnatural sediment in the interim containment cell and procedures and materials to be used to comply with

the minimum standards applicable to the interim containment cell will also be contained in the design documents.

A separate material handling component of the design documents will address the location and construction of all access and haul roads required to implement the interim action. This component of the design must also present mechanisms to achieve compliance with all nuisance dust regulations and procedures to otherwise limit or preclude airborne emissions from all work areas of the project. Currently approved Dust Control documents contain a "No Visible Dust" standard and will be rigorously enforced by the Illinois EPA at the South Ditch work area and all associated material handling locations.

The final segment of the physical construction design documents will define the construction of the interim containment cell cap. The design of this cap must comply with the CAMU regulations and all other indicated ARARs, as well as the load bearing limits of the stabilized unnatural sediments and the physical setting chosen for location of the cell. Generally, this cap must contain a synthetic impermeable over-liner, a clay cover layer and a vegetative or other erosion-protective layer. The types of materials, their minimum thicknesses and permeabilities must comply with the CAMU regulations and guidance, and all other ARARs.

A monitoring and maintenance plan for the interim containment cell must be included in the design documents described above. The monitoring and maintenance plan must address measurement of leachate thickness within the interim containment cell, removal and treatment of that leachate when levels exceed the stipulated level, inspection and maintenance of the cap and a groundwater monitoring plan that is specific to the interim containment cell.

### **3) Implementation of Alternative 4B – Removal of the Unnatural Sediments with On-Site Consolidation**

Immediately following execution of this ROD, the PRPs will be directed to initiate the Treatability Studies described above. When the treatability studies have been completed to the satisfaction of the Illinois EPA, the PRPs will proceed with the Phase 1 components of the Interim Action Design. As this work is being conducted under the authorities of the existing ICO, no delays to negotiate legal instruments are anticipated. This Interim Action is generally consistent with a May 1998 proposal presented by the PRPs except in areas where that proposal ignored or failed to comply with ARARs. The PRPs have expressed concern over the implementability of the remedy absent ARAR waivers but have thus far produced no data to support their position. Comment submitted by the PRPs relative to the Proposed Plan indicate an intention to invoke dispute resolution if this ROD goes forward absent ARAR waiver provisions, however those comments are groundless absent data to support their position. The data required to adequately support the PRPs potential invocation of dispute resolution will be provided via the treatability studies required by this ROD. If following the required treatability studies the technical impracticability of the Alternative #4-B is apparent and ARAR waiver authority or another avenue of

administrative relief from ARARs does not exist (the contingent remedy Alternative #4-B with administrative relief from ARARs), dispute resolution will not be required because, the Illinois EPA commits by this ROD to revisit the issue of remedy selection in it's entirety.

The current conceptual schedule for implementing this interim action anticipates completion of the design and initiation of the infrastructure construction in late September or early October of 2003. This schedule is driven by the need to complete construction of the settling basins and the interim containment cell prior to the seasonally normal dry period from June through September 2004. The June to September time frame is the only realistic period for sediment dredging activity. Therefore, the settling basins and interim containment cell should be nearly complete before the winter of 2003, so that they will be available for use early in the following summer (from June through September 2004). The settling basins and the interim containment cell will be constructed consistent with the design documents. By following the conceptual schedule outlined above, the construction of the basins and cell will not be delayed by an inordinately wet, spring construction season

In the early summer of 2004, the unnatural sediments removal portion of the interim action will begin with the placement of silt fences, dewatering structures (ditches, dikes and well points) and storm water diversion structures. All activities associated with this interim action will be included in work plans that will have been previously approved by the Illinois EPA. As previously noted, this activity is dependent upon weather conditions and is not expected to begin until the Illinois River and Lake DePue are at (or near) normal pool elevations. It is expected that the actual dredging of unnatural sediments will proceed until completion, except for the time period that the American Power Boat Association (APBA) National Championship races are held on DePue Lake. In recognition of the importance of these races to the community, and the interference the dredging activity will have on those races, the following prohibition is included in this ROD: No construction-related activity except maintenance and/or repair of silt fences, water diversion structures, and dewatering structures will occur greater than 1000 feet south of the origins of the South Ditch from 7:00 AM, July 23 through 7:00 PM on August 2, 2004. Between July 23 and August 2, 2004, the APBA will control access to DePue Lake and all remedial activity will adhere to that associations lake access requirements. Other activities deemed critical by the PRPs or the Illinois EPA to protect human health or the environment may be authorized by the Illinois EPA project manager after consultation with appropriate APBA officials.

The actual sequence and mechanics of dredging, transfer of material from the South Ditch to the settling basins, dewatering, stabilizing and transferring to the interim containment cell are, as yet, undetermined. All activities associated with this interim action will be included in work plans that will be reviewed and approved by the Illinois EPA prior to implementation. When practical, approved work plans will be placed in the public repository prior to initiation of an activity, to facilitate public awareness. The work plans will not be the subject of public comment and will be

provided only for public information and awareness. This public availability is deemed appropriate because of the limited viewing access to the work area and the general public's interest in this project.

After the interim containment cell is capped, it will be seeded with appropriate vegetation to limit wind and water erosion and to assist in the overall site water balance. This seeding may not occur until the spring of 2005, depending on the completion of the covering in 2004. When the cover soil layer is in place, the unit-specific, groundwater-monitoring plan will be implemented. Groundwater monitoring around the containment cell will continue until the South Ditch unnatural sediment is incorporated into a final remedy at the site.

It should be noted that the selected remedy may change somewhat as a result of the treatability studies, remedial design and construction processes. Changes to the selected remedy described in the ROD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Difference or a ROD amendment, as appropriate.

#### **Summary of the Estimated Remedy Cost:**

The capital cost for the selected remedy is estimated to be \$1,677,000. Operation and maintenance costs for Year 1 are estimated to be \$11,000 (projected in the FS to be required for 33 years), and total present worth costs are estimated to be \$1,895,000. Cost details for the selected Interim Remedy (and the other alternatives considered) are located in Section X. of this ROD in the Table entitled "Summary Table of Alternative Cost and Time to Complete." All costs presented in this ROD and in the Proposed Plan were taken from the draft 1997 Feasibility Study and no attempt has been made to adjust them for inflation.

#### **Expected Outcomes of the Selected Remedy:**

This Interim Action will result in the removal of a primary threat waste to a secure, stable location. The unnatural sediment has demonstrated a high potential to cause significant ecological injury and the potential to cause adverse human health affects. Also, the unnatural sediment is in a highly mobile location and can very easily migrate away from the South Ditch and spread the potential health and ecological impacts to a larger area of DePue Lake. As a result of this Interim Action, the primary threat waste will be stabilized and placed in a secure containment facility with significantly improved access limitations.

**Cleanup Levels:** No specific chemical concentration action limits are established in this ROD. The Interim Action described herein will remove the approximately 7,900 cubic yards of unnatural sediment identified by the 1996 Focused South Ditch Remedial Investigation as shown on Attachment A to this ROD. The boundaries of OU#1 are included within the limits of OU#5 (DePue Lake) and chemical specific action limits will be established in one or more RODs covering OU#5.

### **XIII. Statutory Determinations**

Under CERCLA Section 121 and the National Contingency Plan: the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous wastes as a principal element and is biased against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

#### **Protection of Human Health and the Environment:**

The Interim Action selected in this ROD will adequately protect human health and the environment until the completion of the selected remedies for the entire South East area of the site. Exposure levels will be reduced to U. S. EPA's generally acceptable risk range of  $10^{-4}$  to  $10^{-6}$  for carcinogenic risk and below the hazard index of 1 for non-carcinogens. The implementation of the selected remedy in the ROD will not pose unacceptable short-term risk or cross-media impacts. This Interim Action will also substantially mitigate the current ecological risks presented by the South Ditch unnatural sediment.

#### **Compliance with Applicable or Relevant and Appropriate Requirements ("ARARs"):**

The selected remedy for the unnatural sediment from the South Ditch has a reasonable potential to comply with all the ARARs identified for the alternative. If, following completion of the required treatability studies, compliance with ARARs is demonstrated to be either technically impracticable or impossible; the Illinois EPA (if authorized) will consider appropriate action to seek waiver or other administrative relief from the encumbering ARARs.

#### **Chemical, Location, and Action-Specific ARARs include the following:**

- Federal Water Pollution Control Act Section 404
- Illinois Administrative Code part 304 (35 IAC, 304)
- U.S. Army Corp of Engineers Nationwide Permit #38
- Clean Water Act FWQC (40 CFR Part 403).
- Federal Water Pollution Control Act Section 401
- Clean Water Act National Pollution Discharge Elimination System ("NPDES") Permit Program  
(40 CFR 122)
- Dewatering basin construction and operation (35IAC 309.202 and 309.203).

- Corrective Action Management Unit (CAMU) requirements (35 IAC 724 Subpart S)
- Closure and Post-Closure requirements (35 IAC 724)
- Illinois Fugitive Dust Standards (35 IAC 212.301)
- Illinois Sound Emission Standards and Limitations (35IAC 900 & 901)
- Illinois Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (35IAC 724, 725)
- Illinois Dept. Of Public Health, Illinois Water Well Construction Code (Section 920) as related to monitoring well construction and closure

**Other Criteria, Advisories or Guidance To Be Considered ("TBCs") for This Remedial Action:**

- Illinois Tiered Approach to Clean-up Objectives (35IAC 742)

In implementing the Selected Remedy, the Illinois EPA, and U.S. EPA have agreed to consider a number of non-binding criteria that are TBCs. These include the guidance on designing RCRA caps, Draft RCRA Guidance Document, Landfill Design, Liner Systems and Final Cover, issued June 1982. The guidance on designing RCRA caps includes specifications to be followed in constructing and maintaining a RCRA cap.

**Cost-Effectiveness:**

The Illinois EPA considers the selected remedy to be cost-effective and a reasonable value for the money to be expended. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). The "overall effectiveness" of the alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant) was assessed against three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness of the alternatives was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the selected remedial alternative was determined to be proportional to its costs and therefore represents a reasonable value for the money to be spent.

The one caveat that must be stated relative to cost effectiveness of this remedy relates to the Technical Impracticability issue discussed above. Following completion of the treatability studies required by this ROD the issue of cost effectiveness must be revisited as a component of the assessment of the Technical Impracticability of the remedy.

The estimated total present worth cost of the selected remedy (Alternative #4B) is \$1,895, 000. Alternative #4C is \$507,000 more expensive, achieves no additional short-term risk reduction,

and negates any potential for future metals recovery from the unnatural sediment. Therefore, the selected remedy is cost-effective.

**Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable ("MEP"):**

As an Interim Action, the selected remedy is not required to meet the permanence and alternative treatment technologies criteria. The selected remedy does, however, provide permanence, compared to the No Action and In-Situ Containment Alternatives. The final remedy(s) for the unnatural sediments and for the South Area of the site are both expected to meet the criteria of permanence. Furthermore, the selected remedy, through stabilization, contains a significant treatment component and will (via on-site containment in a discrete unit) preserve the Resource Recovery potential of this high concentration metal-bearing waste, if such becomes cost effective prior to implementation of the final remedy.

The Illinois EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, the selected remedy provides the best balance of trade-offs (in terms of the five balancing criteria), while also considering the statutory preference for treatment as a principal element, the bias against off-site treatment and disposal and acceptance of the remedy by the U.S. EPA and the community.

**Preference for Treatment as a Principal Element:**

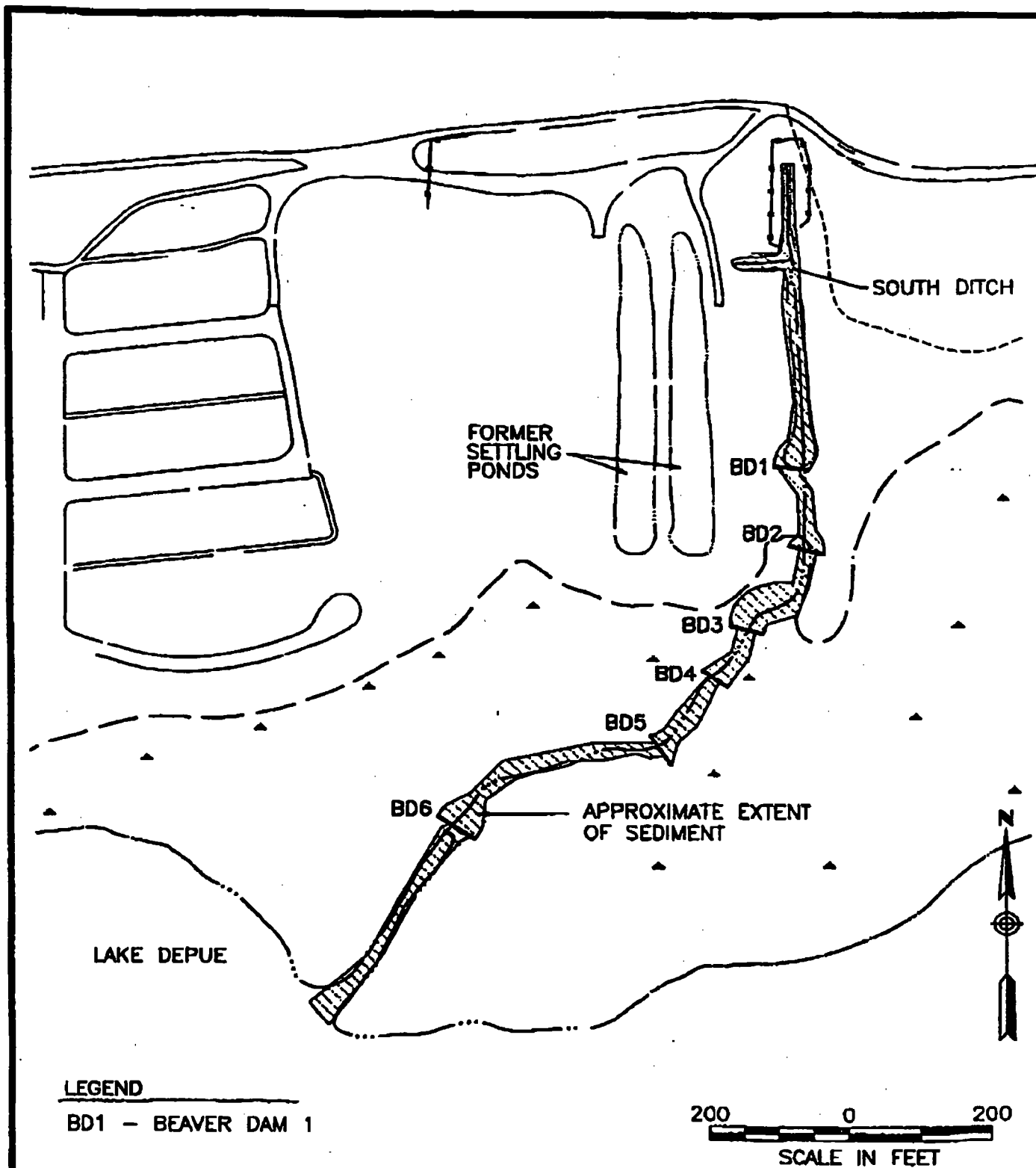
The statutory preference for remedies that employ treatment as a principal element is met. Removal from the dynamic South Ditch along stabilization will achieve a reduction in toxicity and mobility of the metals contamination in the unnatural sediment. As an Interim Action, full and active treatment is not currently warranted. When the final remedy for the unnatural sediments of OU 1 and remedies for OUs 3 and 5 are selected, a more thorough effort to comply with the statutory preference for remedies that employ treatment as a principal element will be required.

**XIV. Documentation of Significant Changes**

The Proposed Plan was released for public comment in October 2002. The Plan identified Alternative #4-B, the interim action of removal of the unnatural sediment with on-site consolidation as the Preferred Alternative for remediation. Extensive discussion of the ARAR waiver issue occurred during the formal public hearing presentation of the Proposed Plan and the fact that Alternative #4-B with administrative relief from ARARs was a contingent remedy.

After considering the nine criteria of remedy selection guidance and with the support of the U.S. EPA, the Illinois EPA has chosen the preferred alternative #4B, with alternative #4B with administrative relief from ARARs maintained as a contingent remedy, as the Interim Action Remedy for the South Ditch Unnatural Sediments OU 1. Therefore, no significant change has been made to the proposed plan. Further information on this selection and the consideration of public comment is summarized in the Responsiveness Summary attached to this ROD and is available in the Administrative Record file for the site.

ATTACHMENT A



LEGEND

BD1 - BEAVER DAM 1

200 0 200  
SCALE IN FEET



CUSTOMER/PROJECT

DEPUE GROUP RI/FS

Chicago, Illinois

TITLE

APPROXIMATE EXTENT OF SEDIMENT

DESIGNED	NAP	DATE	7/15/96	JOB NO.	953-8222
CHECKED	<i>gma</i>	SCALE	AS SHOWN	DWG NO.	
REVIEWED	<i>cm</i>	FILE NAME	8222170	FIGURE NO.	3-1